

REMARKS

I. Summary of the Examiner's Action

A. Objection to Specification Amendments

At page 4, lines 11 – 16 of the April 19 Office Action, the Examiner objected to amendments made to the specification in Applicant's March 19, 2006 Amendment under 35 U.S.C. § 132(a) because they introduced new matter into the disclosure.

B. Claim Rejections

Claims 15, 17, 25 and 26 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.

Claims 1, 2 and 22 stand rejected under 35 U.S.C. § 102(e) as being anticipated by United States Patent No. 6,625,750 to Duso *et al.* (hereinafter "the Duso patent").

Claims 1 and 5 stand rejected under 35 U.S.C. § 102(b) as being anticipated by United States Patent Application Publication No. US 2001/0001563 A1 to Tomaszewski (hereinafter "the Tomaszewski application").

Claim 3 stands rejected under 35 U.S.C. § 103 (a) as being unpatentable over the Tomaszewski application in view of United States Patent No. 6,622,178 to Burke *et al.* (hereinafter "the Burke patent").

Claim 4 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Tomaszewski in view of Burke and further in view of “On-The-Go Supplement to the USB 2.0 Specification Revision 1.0a” of Chandler *et al.* (hereinafter “the Chandler USB 2.0 reference”).

Claims 6, 7, 11, 13, 14, 15, 16, 24 and 25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Burke patent in view of the Chandler USB 2.0 reference.

Claims 17, 18, 19, 23 and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Tomaszewski patent in view of the Chandler USB 2.0 reference.

These objections and rejections are respectfully disagreed with, and traversed below.

C. Allowable Subject Matter

The Examiner objected to claims 8 – 10 and 12 as being dependent upon a rejected base claim, but indicated that the claims would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claim.

II. Summary of Interview Conducted on April 25, 2006

In a telephonic interview conducted on April 25, 2006, the Examiner confirmed that claim 12 was objected to, and would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

III. Applicant's Response – Amendment of Specification

The Examiner alleges that “detection means for detecting the absence of a reply signal and the disconnection of the peripheral” added to the specification is new matter which is not supported by the original disclosure. The applicant disagrees. The specification states, in relation to the interface connected as a default host interface in FIG. 1, that “The A/B interface 12 monitors the second pin contact 42 and the third pin contact 44 and detects when a pull-up resistor [transistor] 24 is connected to the second pin contact (D+) or the third pin contact (D-).” (Application, page 6, lines 22 – 24). The description continues “The USB transceiver 14 provides a detection signal to the controller 30 when a pull-up resistor 24 is detected from one of the data pin contacts 42, 44.” (Application, page 7, lines 4 – 5). It is clear from these passages that the interface monitors the data pin contacts 42, 44 for the connection of a pull-up resistor 24. In the absence of a reply signal in the form of the connection of a pull-up resistor 24, the USB transceiver 14 does not send a detection signal to the controller 30. In the absence of the controller receiving a detection signal, the controller detects that a peripheral is disconnected and will not commence enumeration.

The specification states, in relation to the interface connected as a default peripheral interface in FIG. 2, that “The USB transceiver 114 monitors the state of Vbus via the first pin contact 140, as an attached host interface 122 responds to the SRP by turning Vbus on” (Application, page 10, lines 3 – 4). It is clear that the interface when connected as a peripheral monitors Vbus and that the absence of a reply signal in the form of turning Vbus on by an attached host indicates that the peripheral is disconnected.

Therefore the term “detection means for detecting the absence of a reply signal and the disconnection of the peripheral” is supported in the disclosure as filed and does not constitute new matter.

IV. Applicant’s Response - Rejection of Claims 15, 17, 25 and 26 under 35 U.S.C. § 112, first paragraph

As set forth above with respect to the amendments to the specification objected to by the Examiner, claims 15, 17, 25 and 26 find support in the specification as filed for the foregoing reasons.

V. Applicant’s Response – Prior Art Rejections

A. Applicant’s Invention

Embodiments of the invention relate to a dual-mode USB interface connectable as a default host to a peripheral or as default peripheral to a host that enables power to be removed from Vbus in order to save energy, but that maintains the ability to determine if a device is disconnected or a new device is connected. The interface in embodiments of the present invention checks for a connection by

periodically starting a session if connected as a host or by periodically requesting a session if connected as a peripheral.

In rejecting the claims, the Examiner has relied on art that either does not check a connection, or in which a session is already started, or in which a session request is used in a conventional manner, *e.g.*, to request a session in which data can be communicated and *not* to check a connection.

In the present invention, new session initiation and request functionality implemented in recent standards is used in a novel and non-obvious manner to check connections of hosts or peripherals to the dual-mode interface. None of the art of record, whether taken singly or in combination, shows any appreciation for this mode of operation.

B. Rejection of Claims 1, 2 and 22 Under 35 U.S.C. § 102(e)

It is not seen what relevance the cited portions of the Duso patent have to the claims at issue because the portions do not disclose a method for checking a connection. In the portions of Duso relied upon by the Examiner, a method is disclosed whereby a master controller server and slave controller servers send heartbeat signals indicating their respective failure status. In other words, both the master controller server and slave controller servers are performing a *reporting* operation, wherein the master controller server and slave controller servers are *reporting* their respective status.

Claim 1 is not directed to *reporting* operations. Rather, claim 1 is directed to *testing* operations performed by an interface, wherein the status of a connection is *tested* to determine whether host or peripheral devices have been connected to or disconnected from the interface. In the context of claim 1, the words used to recite this *testing* operation are “periodically checking a connection,” so the Examiner should not be heard to say that a testing operation is not recited. A testing operation *is* recited, but using synonymous words.

In Applicant’s invention, when connected as a default host interface, the interface “periodically *checks a connection*”, and when connected as default peripheral interface, the interface “periodically *checks a connection*.” When connected as a default host interface, the interface checks the connection “by periodically *starting a session*”, and when connected as a default peripheral interface, the interface checks the connection “by periodically *requesting a session*.”

Whether operating as a default host interface, or as a default peripheral interface, the interface does not perform a *reporting* operation when it “periodically checks a connection”; rather it performs a *testing* operation.

The fact that it is a *testing* operation is evident from terminology used in the claims themselves – “checking a connection” – and would be understood as such by one skilled in the art. Further, when read in light of the specification, one skilled in the art would not interpret “checking a connection” as a *reporting* operation, as shown at page 5, line 29 – page 6, line 20 (emphasis added):

“The A/B interface 12 is capable of detecting automatically, without user intervention, a device connected to it by periodically polling Vbus. The USB transceiver 14 repeatedly sends a poll signal via the first contact pin 40. The poll signals are sent periodically as a train of voltage pulses that have a constant interval between them. In alternative embodiments the interval may vary.”

“The USB transceiver 14 achieves this using the controllable switch 16 by periodically switching power on at the first pin contact 40 and then switching power off. The period between the successive occasions on which the USB transceiver 14 switches power on is of the order one second. However, this period may be varied. The duration for which the power is switched on is at least 200ms but preferably of the order 200ms. The duration is dependent upon the acceptable delay in responding to device connection/disconnection/reconnection.”

“The B-interface 22 monitors Vbus and when the voltage on the line exceeds a predetermined threshold, a pull-up resistor 24 is connected to one of the data lines D+, D-. This is not described in detail as this is how a current peripheral USB device responds to a host initiating a session by switching and keeping Vbus on. If the B-interface 22 is a high speed then the pull-up resistor is connected to the data line D+ using a switch. If the B-interface 22 is a low speed interface then the pull-up resistor is connected to the data line D- using a switch.”

The foregoing sections of Applicant's specification should be contrasted with the relied-upon portions of the Duso patent appearing at column 51, lines 25 – 39 and column 52, lines 5 – 8 (emphasis added):

“Each second a ‘heartbeat’ signal is sent over both channels of the dual-redundant internal Ethernet 26 from the master controller server to the slave controller server and from the slave controller server to the master controller server.”

“The heartbeat signal from the master controller server indicates whether or not the master controller server has any failure, such as a processor problem, severe enough that the slave controller server should assume master status. The slave controller server assumes master status when it fails to receive the heartbeat signal from the master controller server within a configurable heartbeat interval or when the heartbeat signal from the master controller server indicates a failure severe enough that the slave controller server should assume master status.”

* * *

“The heartbeat signal from the slave controller server indicates whether or not the slave controller server has any failure severe enough that the master controller server should ‘call home’ and report the failure.”

These portions of Duso describe *reporting* operations where one device reports its respective status to another device and not to *testing* operations where a *connection is checked*.

Further, claim 1 recites that when a device is connected as a default host interface, a connection is checked by periodically *starting a session* and when the interface is connected a default peripheral interface a connection is checked by periodically *requesting a session*. A *session* in the context of the present invention would be understood by one skilled in the art to be defined as in the Chandler USB 2.0 reference which at page 37, section 5.3.1 states “a session is defined as the period of time that Vbus is above the Session Valid threshold of a given device.” As the claim terminology should be interpreted as one of ordinary skill in the art would understand it (see MPEP 2111.01(II)), the term “*session*” should be assigned the meaning set forth in the Chandler USB 2.0 reference. If the Examiner disagrees,

Applicant respectfully requests that the Examiner point out with particularity where in the specification Applicant acted as his own lexicographer and provided a non-standard definition for “session”. According “session” its customary meaning for the purpose of construing claim 1, it is not seen what relevance the heartbeat signals of Duso have to do with “*starting a session*” or “*requesting a session*” as recited in claim 1.

The heartbeat signal in Duso from the master to the slave indicates the operational status of the master, it does *not* start a session. The heartbeat signal from the slave to the master indicates the operational status of the slave, it does *not* request a session. In *both* cases a connection is *not* being checked. Therefore, there is no disclosure or suggestion in Duso of the master server “checking a connection by periodically starting a session” as recited in claim 1 or the slave server “checking a connection by periodically requesting a session” as recited in claim 1.

As a result, independent claim 1 is patentable over the Duso patent. Independent claim 22 is patentable for similar reasons, as is dependent claim 2, which depends from claim 1. Applicant therefore respectfully requests that the rejection of these claims be withdrawn

C. Rejection of Claims 1 and 5 Under 35 U.S.C. § 102(b)

It is not seen what relevance the Tomaszewski application has to the claims at issue because the methods disclosed in Tomaszewski are premised on the assumption that a session as defined in the Chandler USB 2.0 reference already has begun. As a

result, in no meaningful way can it be said that methods disclosed by Tomaszewski “check a connection by periodically *starting a session*”, or “check a connection by periodically *requesting a session*,” as recited in claim 1.

The Tomaszewski application discloses a method of controlling the mode of operation of a digital camera depending upon whether the camera is tethered to a computer or not. The camera has a camera manager 501 that includes a Vbus signal checker 500 which periodically polls a Vbus bit 508 in a software readable register 207. The Vbus bit is asserted when a Vbus signal is detected on Vbus line 200. When the Vbus bit indicates the presence of the Vbus signal, the camera operates in tethered mode. This operates in the conventional manner of the prior art; it is assumed that when the camera is connected Vbus is high as in earlier conventional practice associated with USB interfaces.

In Tomaszewski, in order for the camera to detect a connection to the computer, the camera manager 501 polls a Vbus bit 508 in register 207. In Tomaszewski, Vbus *must already be powered* by the computer upon connection of the camera, because if Vbus were not powered, upon connection, the camera would *not* be able to determine if it was tethered to the computer. In the absence of a Vbus signal, the Vbus bit would not be asserted and the camera would *not* detect connection and, as a result, would operate in portable mode. Further, the camera manager 501 does not request the computer to start a session because Vbus is already powered by the computer upon connection. Therefore, Tomaszewski does not disclose or suggest

“automated means for periodically checking a connection by periodically requesting a session when connected as a default peripheral” as recited in claim 1.

As disclosed, the host interface (computer) in Tomaszewski must continually provide power to Vbus in order for the peripheral interface of the camera to detect if it is tethered to the computer, as discussed above. Therefore, there is no disclosure or suggestion in Tomaszewski of “automated means for periodically checking a connection by periodically starting a session when connected as default host” as recited in claim 1, because Vbus is continually powered.

In summary, Applicants’ invention seeks to avoid having Vbus continually high while still maintaining the ability to check periodically connection status of hosts and peripherals connected to the dual-mode interface. Applicant’s invention accomplishes this by using the session initiation and request functionality implemented in later USB standards in a novel and non-obvious manner to check connection status. It is not seen what relevance a reference which operates in conventional manner – with Vbus already high (*i.e.*, a session is already initiated) – has to the claims at issue. Claim 1 recites “checking a connection *by starting a session*” and “checking a connection *by requesting a session*.” Hence a method that operates on the assumption that a session has already begun – as in the case of Tomaszewski – has no relevance to the claims.

Additionally, Tomaszewski only discloses a computer that acts as host and a camera that acts as peripheral. One end of a USB cable 106 connects to a peripheral

port 107 on the camera and the other end connects to a host port 108 on the computer. The camera cannot act as a host interface and the computer cannot act as a peripheral interface. Therefore Tomaszewski does not disclose “an interface connectable as a default host to a peripheral or as a default peripheral to a host” as recited in claim 1 because Tomaszewski discloses two interfaces, one of which is always host (computer) and one of which is always peripheral (camera).

United States Patent No. 6,898,652 to Peters *et al.* (hereinafter “the Peters patent”) discloses that “... the host periodically polls each attached USB hub device to determine the state of each of the hub’s active downstream ports” (Column 1, lines 20 – 22). Peters continues, “the hub determines the attachment and detachment of devices ... the hub then sets bits in its status register indicating any changes to its ports. The host subsequently reads the status register on the next poll period” (Column 1, lines 25 – 30). Therefore, Peters discloses that the attachment/detachment of devices to a hub is determined by the host periodically polling a status register in the hub. Therefore, Peters does not disclose a host interface checking a connection by periodically starting a session.

Peters also does not disclose an interface connectable as a default host to a peripheral or as a default peripheral to a host, or automated means for periodically requesting a session when connected as a default peripheral.

The Compaq reference discloses that “hubs have status bits that are used to report attachment or removal of a USB device on one of its ports. The host queries

the hub to retrieve these bits” (page 20, section 4.6.1). Like Peters, this document does not disclose that a connection is checked by the host interface periodically starting a session. The host interface only polls a status bit in the hub.

The Compaq reference also does not disclose an interface connectable as a default host to a peripheral or as a default peripheral to a host, or automated means for periodically requesting a session when connected as a default peripheral.

Claim 1 is therefore patentable over any of Tomaszewski, Peters or Compaq, whether taken singly or in combination. Applicant therefore respectfully requests that the rejection of claim 1 be withdrawn on this basis. Claim 5, which depends from claim 1, is patentable both as depending from an allowable base claim for the foregoing reasons, and for reasons associated with its independently-recited features. Applicant therefore respectfully requests that the rejection of claim 5 be withdrawn as well.

D. Rejection of Claim 3 Under 35 U.S.C. § 103(a)

The combination of the Tomaszewski application with the Burke patent is improper *ab initio* because combining the teaching of Burke, as it is interpreted by the Examiner, would render the Tomaszewski method unsatisfactory for its intended purpose in violation of MPEP 2143.01(V). In particular, the Tomaszewski method detects whether a camera is attached to a computer by polling a register that indicates the status of Vbus. As interpreted by the Examiner (Applicant does not admit that Examiner’s interpretation of Burke’s teaching is correct) Burke teaches periodically

energizing Vbus. In the Tomaszewski method, this would result in the register value associated with Vbus status periodically changing, meaning that the camera would periodically operate in untethered mode even when connected to the computer. Such operation would render Tomaszewski's method unsatisfactory for its intended purpose, since its purpose is to ensure the camera operates in tethered mode when connected to the computer.

In addition, regarding the underlying rejection of claim 1 upon which the rejection of claim 3 is premised, the Burke patent does not remedy the underlying deficiency of the Tomaszewski application for the purpose of rendering claim 1 unpatentable. The Burke patent discloses a system for restoring a computer from suspend mode on detecting a stimulus from a USB device, it does *not* check a connection as required by both claim 1 and claim 3. The computer system 10 contains a USB host interface 20, a USB hub 16 and USB peripherals 15, 19. The host interface 20 contains a wake-up controller 34 that is operable to periodically enable a controller power supply 32 to power Vbus. "The wake-up controller then polls the USB peripheral using a secondary non-USB protocol ... If a wake-up stimulus has been received by the peripheral ... wake-up controller 31 wakes up computer system 10" (Burke, Column 4, lines 36 – 42).

In addition, since the Burke method operates by apparatus associated with the host periodically energizing Vbus, it is not seen how Burke recites "automated means for periodically checking a connection by periodically requesting a session when connected as a default peripheral interface" as recited in claim 1. Nowhere in Burke

is there any description or suggestion that the peripheral checks a connection by periodically requesting a session. Accordingly, Burke does not remedy the underlying deficiency of the rejection of claim 1 upon which the rejection of claim 3 is premised.

With respect specifically to the rejection of claim 3, in Burke, the wake-up controller polls the peripheral to see if a wake-up stimulus has been received by the peripheral, *not* to check a connection. In fact, it is assumed that the peripheral is connected throughout time period when Burke's method is intended to operate, because a wake-up stimulus *cannot* be received unless the peripheral is connected! Therefore, Burke does not disclose a "means for periodically checking a connection is operable to periodically apply a voltage to the power signal contact and to receive a response via the data signal contact" as required by claim 3.

For the foregoing reasons Applicant respectfully requests that claim 3 is patentable over the combination of Tomaszewski and Burke.

E. Rejection of Claim 4 Under 35 U.S.C. § 103(a)

Applicant respectfully submits that the underlying combination of Tomaszewski and Burke assumed in the rejection of claim 4 is improper for the reasons set forth above with respect to claim 3.

In addition, the Tomaszewski method already is capable of checking whether the camera is connected to the computer – it does so by detecting status of Vbus by

polling a register – it does not need to be modified in the manner of the Examiner. In fact, combining the references in the manner of the Examiner requires a fundamental change in the manner of operation and wholesale redesign of the primary reference Tomaszewski since the Tomaszewski reference operates assuming that Vbus is continually powered. Combining the references in the manner of the Examiner requires that Vbus be unpowered, thereby changing the principle of operation of the primary reference in violation of MPEP 2143.01(VI).

Further, even assuming the combination of the references in the manner of the Examiner is proper, the combination leaves an unresolved issue which renders Tomaszewski unsatisfactory for its intended purpose in violation of MPEP 2143.01(V). In particular, the Tomaszewski method is directed to operating a camera in a tethered mode when connected to a computer. This requires periodic monitoring. The Chandler USB 2.0 Reference only teaches that a Session Request Protocol be used when a session is required by the peripheral, for example, to transfer data to the host. It says nothing about using the session request protocol in a periodic manner to test a connection. In fact, the only place where it is appreciated that the session initiation and request functionality can be used to periodically test a connection is in Applicant's disclosure. Accordingly, it is the epitome of hindsight to accord the Chandler USB 2.0 Reference credit for this realization.

The Chandler USB 2.0 reference discloses that in order to conserve power, an A-device can leave Vbus turned off when the bus is not being used. A B-device can use a session request protocol (SRP) to request an A-device to supply power on Vbus

to start a session. Chandler discloses that the SRP is used for requesting an A-device to turn Vbus on, not for checking if a device is connected. Chandler does not disclose that a B-device *periodically* uses the SRP. Therefore, there is no disclosure or suggestion in Chandler of using the SRP for periodically checking a connection.

The Examiner alleges that there is nothing to prevent the SRP being repeated periodically because Chandler teaches that the B-device may repeat the SRP at any time. Even though Chandler states that the SRP could be repeated at any time, there is nothing disclosed or suggested that would lead a person skilled in the art to believe that the SRP is repeated periodically. There would be no motivation for Chandler to periodically repeat the SRP because in Chandler the SRP is used by a B-device to request a session, not to check for connection and disconnection. A person skilled in the art would not interpret Chandler to teach that a B-device periodically uses the SRP. As Chandler does not relate to checking the connection/disconnection of a peripheral, a person skilled in the art would not look to Chandler to modify any of the art of record.

Accordingly, Applicant respectfully requests that the rejection of claim 4 be withdrawn for the foregoing reasons.

F. Rejection of Claims 6, 7, 11, 13, 14, 15, 16, 24
and 25 Under 35 U.S.C. § 103(a)

Applicant has amended claim 6 to recite that the reason for repeatedly sending a poll signal is “to check a connection.” Claim 24 has been similarly amended. As set forth above, the Burke patent does not “check a connection”; instead the Burke

patent wakes up a host computer from a "sleep" mode. The Chandler USB 2.0 Reference does not disclose "sending a poll signal via the power signal contact to check a connection"; rather, in Chandler sending a poll signal (*i.e.*, initiating a session or requesting a session) is for the purpose of starting a session. There is no appreciation that the session initiation and request functionality disclosed in the Chandler reference can be used for the purpose of detecting connection or disconnection of hosts and peripherals from the dual mode device.

The Examiner alleges that claims 6 and 24 are obvious in view of Burke and Chandler. A person skilled in the art would not look to Chandler to rectify the deficiencies in Burke, because there is nothing to suggest it. Any such combination must result from improper hindsight. Therefore claims 6 and 24 are non-obvious.

The Examiner alleges that claims 15 and 25 are obvious in view of Burke and Chandler. Even if the references were combined, the combination would not fall within the scope of the claimed invention because in Burke the host interface does not check for disconnection by detecting the absence of a reply signal. The wake-up controller polls the peripheral to see if a wake-up stimulus has been received. If it has, the wake-up controller wakes-up the computer, if not the wake-up controller receives an indication that there is no stimulus and the computer remains in suspend mode awaiting a stimulus from the peripheral. As a result, Burke does not disclose "detection means for detecting the absence of a reply signal and the disconnection of the peripheral" as recited in claims 15 and 25. Therefore, claims 5 and 15 are non-obvious.

Accordingly, independent claims 6, 15, 24 and 25 are patentable for the foregoing reasons. Applicant respectfully request that the rejection of these claims be withdrawn. Applicant respectfully submits that dependent claims 7, 11, 14 and 16 are patentable both as depending from an allowable base claim and for reasons attributable to their independently-recited features. Applicant therefore respectfully requests that the rejection of claims 7, 11, 14 and 16 be withdrawn as well.

G. Rejection of Claims 17 – 19, 23
and 26 Under 35 U.S.C. § 103(a)

The Examiner alleges that claim 17 and 26 are obvious in view of Tomaszewski and Chandler. Tomaszewski does not disclose detection means for detecting the absence of a reply signal. In Tomaszewski the camera manager periodically polls the Vbus bit to check for a connection. The Vbus bit indicates whether the camera is tethered to the computer or not. Therefore, Tomaszewski determines disconnection by receiving a reply from the Vbus bit indicating that Vbus is disconnected, not by the absence of a reply signal. Therefore, even if the documents were combined, the combination would not fall within the scope of the present invention. Therefore claims 17 and 26 are non-obvious.

Applicant respectfully submits that independent claim 23 is patentable for reasons similar to those set forth in the foregoing arguments. In particular, Tomaszewski does not check a connection by starting or requesting a session; and the Chandler USB 2.0 reference shows no appreciation for the fact that session initiation and request functionality can be used to check a connection.

Accordingly, Applicant respectfully submits that independent claims 17, 23 and 26 are patentable over the art of record, whether taken singly or in combination. Applicant therefore respectfully requests that the rejection of claims 17, 23 and 26 be withdrawn. Applicant also respectfully submits that dependent claims 18 and 19 are patentable both as depending from allowable base claims and for reasons attributable to their independently-recited features.

VI. Conclusion

Applicant submits that in light of the foregoing remarks and amendments the application is now in condition for allowance. Applicant therefore respectfully requests that the outstanding rejections be withdrawn and that the case be passed to issuance.

Respectfully submitted,

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Date

David M. O'Neill (35,304)

David M. O'Neill (35,304)

Customer No.: 29683

HARRINGTON & SMITH, LLP
4 Research Drive
Shelton, CT 06484-6212
Telephone: (203) 925-9400
Facsimile: (203) 944-0245
Email: DOneill@hspatent.com

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